

**DECISION NUMBER THIRTEEN
TO THE TREATY ON OPEN SKIES**

**METHODOLOGY FOR CALCULATING THE MINIMUM PERMISSIBLE FLIGHT
ALTITUDE WHEN USING OPTICAL AND VIDEO CAMERAS**

The Open Skies Consultative Commission, in accordance with Article X, paragraph 5, and pursuant to Article IV, paragraph 2 (A) and Article VI, Section I, paragraphs 14 and 15, and Section II, paragraphs 4, 5 and 6 of the Treaty on Open Skies, has decided as follows:

SECTION I. DEFINITION OF TERMS

The following definitions shall apply to terms used in this Decision:

1. The term "altitude" means the vertical distance of a level, point or object considered as a point, measured from mean sea level (MSL).
2. The term "flight level (FL)" means a surface of constant atmospheric pressure which is related to a specific pressure datum, 1013.2 hectopascals (hPa), and is separated from other such surfaces by specific pressure intervals. The datum 1013.2 hPa has the same value as 1013.2 mb, 29.92 inches Hg and 760 mm Hg.
3. The term "height" means the vertical distance of a level, a point or an object considered as a point, measured from a specified datum. The datum used in this Decision is the ground level at the nadir point.
4. The term "elevation" means the vertical distance of a point or level, on or affixed to the surface of the earth, measured from mean sea level.
5. The term "leg" means a portion of the segment between two co-ordinates, navigation fixes or turning points designated in the mission plan.

SECTION II. FORMULAE

1. For conversion from metres to feet the factor 3.281, and from feet to metres the factor 0.305 will be used.
2. The "minimum permissible altitude" A for the use of sensors for each leg of an observation flight is calculated according to the formula:

$$A = E + H_{\min}$$

where

E is the maximum ground elevation on a given leg;

H_{\min} is the certified minimum height at which a sensor may be operated;

Note: H_{\min} is normally stated in metres.

3. If the forecast temperature at altitude over the point of maximum ground elevation E for a given leg of an observation flight deviates from that of ICAO standard atmosphere (ISA), the barometric altitude A is adjusted according to the following formula:

$$A_t = A - (A \times K_t)$$

where

- A_t is the barometric altitude to be flown to achieve H_{min} after adjustment for the outside forecast temperature;
- K_t is the correction factor corresponding to the ISA deviation:
 $K_t = dT \times 1/288$
- dT is the forecast temperature in degrees centigrade minus the ISA temperature in degrees centigrade.

4. If required, the "minimum permissible flight altitude" A_f for each leg of an observation flight is calculated according to the following formula:

$$A_f = A_t + (\text{Standard pressure setting} - \text{local QNH}) \times \text{Coefficient}$$

where

- A_f is the barometric flight altitude after adjustment for standard atmospheric pressure;
- Standard pressure setting
is a specific pressure datum as given in Section I, paragraph 2;
- local QNH
is the forecast air pressure on the ground at the point of maximum ground elevation E of a leg of an observation flight extrapolated to sea level and the envisaged overflight time;
- Coefficient
is a factor which adjusts the altitude for a given change in atmospheric pressure.

5. For standard combinations of pressure and altitude units, the formulae to be used are:

For pressures in inches Hg and distances in feet:

$$A_f = A_t + (29.92 - \text{local QNH}) \times 924.05;$$

For pressures in hPa or mb and distances in feet:

$$A_f = A_t + (1013.2 - \text{local QNH}) \times 27.30;$$

For pressures in mm Hg and distances in metres:

$$A_f = A_t + (760 - \text{local QNH}) \times 11.09.$$

SECTION III. CALCULATION OF THE MINIMUM PERMISSIBLE ALTITUDE AND SELECTION OF CRUISING ALTITUDE

The minimum permissible altitude for the use of sensors, taking into consideration the ground resolution permitted for optical and video cameras, is calculated as follows:

1. The maximum ground elevation E for the calculation of the altitude A_t to be flown is determined along the line of the nadir for each leg of the observation flight. If the observed State Party considers that, as a result of specific terrain features, the maximum sensor resolution permitted by the Treaty will be exceeded, they have the right to propose changes to the mission plan in accordance with Article VI, Section II, paragraph 6.

2. In principle, the minimum permissible altitude A for the use of sensors is the altitude resulting from the sum of the maximum ground elevation E and the minimum permissible height above ground level H_{\min} for the respective sensor.

3. Prior to submission of the mission plan, on the basis of the current weather forecast, the altitude calculated in accordance with paragraph 2 shall be adjusted, if necessary, by the correction factor for the deviation of the true temperature from ISA temperature. The formula used in this calculation shall be that given in Section II, paragraph 3.

4. Should the use of cruising altitudes be prescribed by national air traffic control regulations, the barometric altitude A_t calculated in paragraph 3 shall be converted to a cruising altitude in accordance with the following procedure, unless otherwise agreed: the cruising altitude shall be selected which is nearest to - either above or below - the barometric altitude A_t and which does not result in a deviation from A_t exceeding 500 feet or 150 metres.

SECTION IV. CALCULATION OF THE MINIMUM PERMISSIBLE FLIGHT ALTITUDE AND SELECTION OF FLIGHT LEVEL

The minimum permissible flight altitude for the use of sensors, taking into consideration the ground resolution permitted for optical and video cameras, is calculated as follows:

1. Prior to submission of the mission plan, on the basis of the current weather forecast, the barometric altitude calculated in accordance with Section III, paragraph 3 shall be adjusted by the correction factor for the difference between the specific pressure datum as given in Section I, paragraph 2 and local air pressure on each leg of the route. To make this calculation, the appropriate formula in Section II, paragraph 5 shall be used.

2. Should the use of flight levels be prescribed by national air traffic control regulations, the barometric altitude A_f calculated in paragraph 1 shall be converted to a flight level in accordance with the following procedure, unless otherwise agreed:

the flight level shall be selected which is nearest to - either above or below - the barometric altitude A_f and which does not result in a deviation from A_f exceeding the following values:

- 500 feet below flight level 290;
- 1,000 feet above flight level 290 or;
- 150 metres below 8,100 metres;
- 250 metres above 8,100 metres and below 12,100 metres;
- 500 metres above 12,100 metres.

SECTION V. DEVIATION IN GROUND RESOLUTION

If in the case of an exception, when the application of the rules according to Section III, paragraph 4 or Section IV, paragraph 2 results in the use of a cruising altitude or a flight level, the deviation in ground resolution from the Treaty-specified 30 centimetres shall not exceed plus/minus 5 centimetres.

SECTION VI. REVIEW CLAUSE

The provisions of Section III, paragraphs 1 and 4, and Section IV, paragraph 2 shall be re-examined on the basis of practical experience if so requested by a State Party after 31 December of the year following the year during which the Treaty entered into force.

This Decision shall enter into force simultaneously with the Treaty on Open Skies and shall have the same duration as the Treaty.

Decided in Vienna, in the Open Skies Consultative Commission, on 18 April 1994, in each of the six languages specified in Article XIX of the Treaty on Open Skies, all texts being equally authentic.